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# **Report to the Joint Legislative Education Oversight Committee**

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*Modifications to the State School  
Technology Plan*

*SL 1997-443, Sec. 8.26(b)*

*G.S. 115C-102.6B*

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**Date Due: January 1, 2009**

Report #35

DPI Chronological Schedule, 2008-2009

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## The State Technology Plan

### Background

North Carolina's current State Technology Plan was originally submitted November 2006. GS115C-102.6 requires that the plan be rewritten every five years, indicating that a new plan is due November 2011. GS115C-102.6 also requires that the current plan be reviewed every two years, and revised if necessary. A revision was submitted in December 2006, but a subsequent revision was submitted in July 2007 to reflect the State Board of Education (SBE) 21st Century Future-Ready strategic plan. Therefore, the next revision, if necessary, should be due to the legislature in June 2009.

### Technology Planning in Progress

In planning discussions over the last two years for the implementation of the connectivity initiative, NC Department of Public Instruction (NCDPI) staff and State Information Technology Services (ITS) staff reached the conclusion that there is a significant need for a new State Technology Plan for North Carolina, to which local school systems shall align their local technology plans. In May 2008, the agency contracted with Gartner, Inc., to study the current State Technology Plan and technology planning processes. Gartner, Inc. is the world's leading information technology research and advisory company. Gartner is working with the SBE and NCDPI to research, analyze and interpret the business of information technology within the context of NCDPI as well as across the 115 school districts. This study, which has been comprehensive and has included extensive input from across the state, has just been completed. The findings and recommendations will be formally shared with NCDPI in March. At that time NCDPI will use the Gartner findings and recommendations to initiate, with the support and partnership of the Technology Commission, the development of a new State Technology Plan to be completed by the 2010 Short Session of the General Assembly.

While the recommendations from the study are outlined and summarized below, these recommendations should still be considered "draft" until accepted by NCDPI and the SBE.

### Gartner Recommendations:

The focus of the Technology Master Plan is on identifying and understanding enterprise local education agency (LEA) IT needs and the technology service capabilities needed to enable them. The recommendations focus on the need for expanding and enhancing the LEA planning process; establishing and implementing processes for managing the LEA portfolio of IT needs; and increasing IT service management capabilities for the LEAs.

### Summary

Upon formal presentation of the Garner study to SBE/NCDPI leadership in March, NCDPI will have in place a template to assist in the development of a new State Technology Plan that will frame the direction for technology needs for the K-12 educational community for at least the next five years. LEAs will use that new plan to align their local planning processes and plans to the State vision. The new State plan should take into account the infusion of technology into instruction, student assessment, teacher preparation and in-service, communication, and parent involvement, to name a few business needs. In a 21<sup>st</sup> Century learning environment, technology can no longer be seen as just an add-on to learning, it is a crucial component of any educational endeavor. In order to remain competitive, North Carolina must be positioned to offer 21<sup>st</sup> Century tools and classrooms. A newly developed State Technology Plan will guide policymakers in their decisions regarding deployment of resources against that goal.



North Carolina  
Educational Technology Plan

2007-2009

Division of Instructional Technology  
November 2006  
Revisions July 2007

North Carolina  
Educational Technology Plan  
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## **The North Carolina Educational Technology Plan 2007-2009**

### **Vision Statement**

As mandated by North Carolina law GS115C-102.6, North Carolina has developed a state educational technology plan to enhance teaching and learning within all its schools. In keeping with the North Carolina vision of building collaborative partners and leadership, a Media and Technology Advisory Committee provides the optimal medium for creating a system-level technology plan and for implementing a strong educational technology program. Planning is most effective when those responsible for the instructional program are involved in designing, implementing, and making decisions about administrative and educational technology. Students are more likely to be successful in achieving in-depth learning when the administrative and teaching staff and the community build a collective vision for technology that is connected to teaching and learning.

The North Carolina Educational Technology Plan has been designed to reflect North Carolina's Future-Ready Schools for the 21<sup>st</sup> Century. This will be done by supporting and enhancing the North Carolina State Board of Education's strategic priorities of Globally Competitive Students ; 21<sup>st</sup> Century Professionals, Healthy and Responsible Students; Leadership for Innovation; and 21<sup>st</sup> Century Systems.

### **Globally Competitive Students**

In order to become leaders in a global market, North Carolina students and their teachers need 21<sup>st</sup> Century resources and skills as part of their educational preparation. Technology is a tool that enables teachers and administrators to work more productively, offering solutions for time management, student monitoring and intervention, and interesting and effective lessons and classroom activities. Recent studies demonstrate that students with exposure to computers are doing better academically than their peers without computers. *White, Ringstaff, and Kelley (2002)* NC WiseOwl and Kaleidoscope, both North Carolina Department of Public Instruction initiatives, are models of well-designed instructional technology resources. NC WiseOwl is a curriculum-based reference Web resource that enables students to interact with and explore the world, bringing a wealth of information and experiences into the classroom, thus potentially overcoming geographical isolation, physical barriers, and economic hardships. Kaleidoscope is a Web portal that encourages students' creativity and self-direction, while developing twenty-first century computer and information skills. Career Technical Education departments in each Local Education Agency (LEA) have a wide range of technology resources that can be used for training and for evaluating student progress. Ultimately, technology is a tool that helps every teacher and every student master basic skills and develop critical thinking and problem-solving abilities in addition to fostering collaboration and communication outside of the school walls. Through NC WISE utilization, technology can be a support tool to reinvent schools via data-driven decision-making so that all students can achieve at higher levels and are better prepared for the workplace.

## **21<sup>st</sup> Century Professionals**

Because technology increases productivity, brings worldwide experience and expertise into the classroom, and stimulates interest in learning, it is the ultimate tool in the professional educator's repertoire. It offers a variety of tools that help decrease the time spent on paperwork, thus increasing time available to spend with students. Access to the Internet offers endless opportunities for professional development and educational research, as well as access to up-to-date curriculum resources. With statewide resources such as NC WISE, HRMS, BUD, NC WiseOwl, Kaleidoscope, and e-Bistro, teachers, administrators, and staff have desktop access to a variety of information resources. This information allows educators to track individual progress and mastery of skills (and the conditions that might affect that progress); develop strategies, skills, and policies that assist in that mastery; and, ultimately, create a quality, data-driven environment that affects high student achievement.

Technology promotes professional growth by providing a variety of opportunities for professional development. Telecommunications overcomes time and distance barriers that limit the resources for teachers and staff, particularly, in remote locations. Distance learning, online classes, and streaming video offer avenues for learning new instructional theories and developing new teaching strategies and essential skills. Through electronic collaboration with institutions of higher education, community colleges, and other public schools, local school systems are able to maximize professional development programs. E-Bistro, and the NCDPI Star Schools distance learning series are two statewide initiatives that extend and expand professional development opportunities beyond the school.

## **Healthy and Responsible Students**

The advent of technology into site planning and building design has increased the potential for creating a safe environment for teaching and learning. A technology infrastructure that includes integrated security and protection systems, such as telephones in every classroom, warning devices, and monitoring cameras, protects individuals and the facility. Network infrastructure design and management, including security and virus protection, enable educators to ensure safe, curriculum-centered technology use school-wide. The real benefit of technology in a safe and orderly educational environment, however, is in the resources it brings into the classroom and school library media center. Because technology opens doors to the world, while simultaneously focusing students on the task at hand, student interest and motivation are heightened and discipline problems decrease. A project-based teaching environment allows students to take responsibility for their own learning, thus developing the habit of life-long educational respect and independence. When students are motivated and successful, they tend to work harder and longer, raising the possibility of higher student achievement. This success fosters a culture in which learning is the expectation and ultimate goal.

## **Leadership for Innovation**

In a 21<sup>st</sup> Century learning environment, technology allows the educational community to become leaders in thoughtful, research-based innovation throughout the local, state, national, and world communities. Technology is the fundamental vehicle for communication with the nation, the state, the community and the family. E-mail, telephones in every classroom, community-access television, and school resources electronically available throughout the community allow and encourage adult participation in a child's education. Community Technology Learning Centers provide facilities where parents, teachers, students, and the community can learn new skills and share resources.

The highest level of student achievement occurs when families, schools, and community organizations work together. (Dede, 1998) Parents can increase involvement as time constraints dissolve and

education-related interactions occur in the comfortable, familiar context of home. With technology, the school and its values of learning and achievement can enter every home, thus enhancing and extending teaching and learning to every individual regardless of age or socioeconomic status. Eventually, this pervasiveness creates the culture that enables North Carolina's schools to become First in America by 2010.

## **21<sup>st</sup> Century Systems**

Schools realize the benefits of a technology-rich environment through state-driven economies of scale and individual outcomes of increased productivity and more efficient time management. Online student management systems and application software allow teachers to focus more on teaching and less on clerical tasks. Online administrative and clerical resources such as North Carolina Window on Student Education (NC WISE), Transportation Information Management System (TIMS), Human Resource Management System (HRMS), Budget Utilization and Development (BUD), and CECAS have streamlined the reporting and information management process. Through statewide resources such as NC WISE and NC WiseOwl, every educator in North Carolina has the opportunity to access a broad range of essential information and resources that affect teaching and learning.

Telecommunications has increased the availability of lifelong learning opportunities through e-learning, including streaming video, online and satellite-delivered courses, and reference and curriculum Web resources. Distance learning, brought into the classroom via the Internet, satellite video, fiber optics, or even cable, also allows students to complete college courses, get Advanced Placement credits, take classes when no certified teacher is available locally, or even complete a high school diploma at home.

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## **Strategic Priority 1: Globally Competitive Students**

### ***Essential Questions***

**Under what conditions does technology have the most benefits for students?**

**How does a state ensure quality and equity in student learning and integration of technology?**

**How can technology foster continued student growth and promote life-long learning?**

**How can technology influence and foster independent learning and higher order thinking skills necessary for a global society?**

**How does effective collaboration impact student achievement?**

**How can technology support global collaboration and communication in the classroom and beyond?**

According to the enGauge Model (<http://www.metiri.com/features.html>) for 21<sup>st</sup> Century Skills, in order to enact academic achievement we must address the areas of digital literacy, inventive thinking, effective communication and high productivity. Students must be taught and given ample opportunities to experience technology not only as an enhancement device but as a tool to master current subjects and topics. In addition, students must be challenged to utilize tools to produce evidence of learning that express higher order thinking, collaborative efforts and the global reasoning required in our current society.

The five elements of 21<sup>st</sup> Century learning that should be in order to promote this type of student growth include

- An emphasis on core subjects;
- An emphasis on learning skills;
- Use of 21<sup>st</sup> Century tools to develop learning skills;
- Teaching and learning in a 21<sup>st</sup> Century context;
- And use of 21<sup>st</sup> Century assessments that measure 21<sup>st</sup> Century skills. (Partnership for 21<sup>st</sup> Century Skills, [http://21stcenturyskills.org/images/stories/otherdocs/P21\\_Report.pdf](http://21stcenturyskills.org/images/stories/otherdocs/P21_Report.pdf))

While few would argue that education should move towards these goals, it is imperative that we establish a culture within the state, the LEA, the school and the classroom that does support both students and teachers in this vision. Systemic change should occur, which moves education from the delivery of information from the teachers, to the student, to a discovery of learning on the part of the student as led by the teachers. Collaboration in support of the learning environment with the focus on designing challenging, real-world, authentic learning experiences for students should be at the center of this change.

White, Ringstaff, and Kelley (2002) find that integrating technology within the curricular framework increases student achievement. In research that has been replicated in 16 states, Lance et al (1992) concluded that students in schools with well-equipped school media centers and professional media specialists will perform better on achievement tests for reading comprehension. Current research indicates the need to move beyond “integrating” competencies into the curriculum to the transparent

use of appropriate resources and technologies to stimulate higher order thinking skills. By making students active learners in control of their learning experiences, students are empowered. There is, however, no substitute for the knowledgeable teacher who guides students through this active learning process. Technology serves to enhance and facilitate this process.

A thoughtfully planned technology program deriving its design from the instructional goals of the school is the best use of technology to affect high student achievement. Research supports the idea that the targeted use of technology for specific instructional goals has a positive effect on student outcomes. In order to positively affect student achievement through technology, one must also affect a change in teacher beliefs and provide an adequate computer to student ratio within the classroom.

These 21st Century Learning Skills can best be taught when media and technology professionals collaborate with classroom teachers in the development of project-based units and/or lessons. This model is outlined in *IMPACT: Guidelines for Media and Technology Programs* (2005). In support of this model, Lance et al (2000) found that elementary school students with the most collaborative teacher-librarians scored 21% higher on Colorado Student Assessment Program reading than students with the least collaborative teacher librarians. Furthermore, they found that “teacher-librarians from high schools with the best Oregon Statewide Assessment reading-language scores are twice as likely as their colleagues from the lowest scoring schools to plan collaboratively with classroom teachers, and their students are more than three times as likely to visit the library as part of a class or other group.” Technology facilitators, with parallel support positions within schools, should garner the same results in future research studies.

In order to understand the place of 21<sup>st</sup> Century Learning Skills in our classrooms, we must first understand the students we are teaching. As Claudia Wallis (2006) points out in her Time Magazine cover article,

Kids spend much of the day as their great-grandparents once did: sitting in rows, listening to teachers lecture, scribbling notes by hand, reading from textbooks that are out of date by the time they are printed. A yawning chasm (with an emphasis on yawning) separates the world inside the schoolhouse from the world outside.

In a world of mobile media devices and cell phones, tradition in the classroom is lost on the very individuals the education system is there to support.

Schacter (1999) concludes that student attitudes and motivation toward learning are more positive when computers are used for instruction. Students learn more in less time with computer-based instruction. Schacter’s findings are substantiated by Apple Computer’s research (2002): “The keys to raising student achievement are to provide students with a solid foundation of basic skills and to motivate them to learn. Technology can help accomplish this goal. It engages students and fires their imaginations. It helps teachers stimulate young minds in ways that make a profound and lasting difference. Numerous research studies on the impact of technology on student achievement have demonstrated this finding with remarkably similar results.”

A variety of technology hardware and software solutions are capable of impacting academic achievement. J.T. Fouts (2000) has found that students learn more quickly and with greater retention when learning with the aid of computers, and that the use of computers appears most promising for low-achieving and at-risk students. The key to impacting achievement is determined by the extent that technology can add rigor and relevant solutions to the accomplishment of identified instructional goals. One measure of this is the Rigor/Relevance Framework from the International Center for Leadership in Education (Daggett, n.d.). The framework can be used to assess levels of knowledge

processes (awareness, comprehension, application, analysis, synthesis, and evaluation). It also can assess levels of application:

- Knowledge in one discipline
- Apply knowledge in one discipline
- Apply knowledge across disciplines
- Apply knowledge to real-world predictable situations
- Apply knowledge to real-world unpredictable situations

( <http://www.leadered.com/rigor.html> )

Three areas in which a technology overlay can influence academic achievement are in collaborative instruction, differentiated instruction, and project-based learning. As stated previously, collaborative instruction occurs when teachers, media personnel, technology facilitators, experts, etc., are involved in the planning, implementation, and evaluation of an instructional program infused with media and technology. Technology can be used to add value to the following attributes of collaborative instruction:

- Evidence of planning
  - Diagnostic information to plan lessons
  - Information- and technology-rich lesson plans
  - Evaluation instruments (checklists, rubrics, etc.)
  - Planning documents from teachers and support personnel
  - Shared schedules and timelines
- Evidence of implementation
  - Presence of other instructors and/or support personnel
  - Models of technology integration
  - Student journals/logs
  - Resource-rich learning environment
  - Classroom design that facilitates group work
- Evidence of evaluation
  - Media center and lab usage records
  - Evaluation instruments

Although various perspectives exist regarding the origin of learning styles, research in this area indicates that effective instruction adapts to the individual needs (perceptual, emotional, physiological, etc.) of students (Collinson, 2000; Dunn & DeBello, 1999; Dunn et al, 1995). Technology can be used to add value to the following attributes of differentiated instruction:

- Use of diagnostic information to plan instruction
- Instruction that includes assessment
- Lesson Plans, rubrics, student work products
- Student grouping for projects

Project-based learning is a comprehensive approach to classroom learning designed to engage student investigation of authentic problems, including an in-depth study of a topic worth learning.

<http://www.bgsu.edu/organizations/ctl/proj.html> . Technology can be used to add value to the following attributes of project-based learning:

- Rubrics
- Lesson Plans
- Interdisciplinary Lessons
- Newsletters, Web pages, correspondence

“Indeed, thoughtless reliance on technology is a liability, not an asset. Yet, when used right—when linked to a simple, clear, and coherent concept rooted in great understanding—technology is an essential driver in accelerating forward momentum. But when used wrong—when grasped as an easy solution, without deep understanding of how it links to a clear and coherent concept—technology simply accelerates your own self-created demise.” (Collins, 2001)

As North Carolina moves towards providing a 21<sup>st</sup> Century learning environment, it is essential that educators embrace the emerging technologies that not only represent the tools students will need as they enter the work force, but also that provide the necessary venues for 21<sup>st</sup> Century collaboration and communication skills. As Time Magazine illustrates’

Kids also must learn to think across disciplines, since that's where most new breakthroughs are made. It's interdisciplinary combinations--design and technology, mathematics and art--"that produce YouTube and Google," says Thomas Friedman, the best-selling author of *The World Is Flat*. (Wallis, 2006)

In his article “A Day in the Life of Web 2.0” David Warlick (2006) describes a school where the tools of Web 2.0, blogging, podcasting, wikis and other collaborative tools, are used by students, teachers, administrators, and parents alike to access, share, and develop information pertinent to learning. As Web 2.0 tools grow in popularity with mainstream Internet users, it is the responsibility of educators to harness this power to improve both learning and instruction. Students and teachers across North Carolina are already blogging and podcasting, but as with any emerging technology, the samples are diverse and not yet mainstream.

The power of podcasting is but one example in these new and diverse tools. In blending media and technology with classroom instruction, podcasting can deliver many 21st Century Skills for those directly involved and for an unlimited number of students indirectly involved. In a recent search on Apple's iTunes Music Director, over 400 podcasts were listed as created by K-12 students. On Yahoo!'s listing, over 900 K-12 podcasts were shown (Selingo). These podcasts range from writing tips to student news and history re-enactments. Students help to create the content, then record the shows using special software. At the teacher's discretion, the completed podcast can be uploaded and

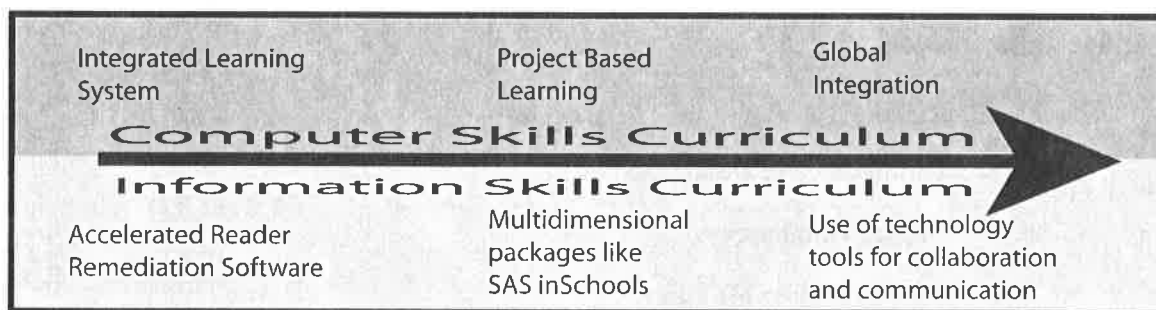
shared with students across the world. Podcasting provides a tool for enrichment and product-based learning in a popular, 21st Century Skill context.

It is also necessary to realize that as technology rapidly changes, education must be willing to welcome those changes. Just as the Web 2.0 technologies have charged to the forefront in the last two years, so may the next great tool influence education. Systems should be put in place to allow for the flexibility to accept and use tools before they become outdated.

In order to place these emerging technologies in the hands of students and teachers, it is necessary to provide adequate access to tools by which they can use and develop such technologies. Early evaluation of ongoing 1:1 projects is encouraging. Studies like that conducted with Michigan's 1:1 program show an increase in cooperative and experiential learning and computer activities involving critical thinking. In addition, students' reflections included positive responses (McHale, 2006). In North Carolina, the Greene County 1:1 project reflects a change in student attitude and school atmosphere (Profiles in Success: Greene County School System). Even with examples like these, the debate over 1:1 computing continues. Resources for and against the movement can be found at <http://www.eschoolnews.com/resources/reports/1to1computing/>.

### ***Current Situation***

Across the state there is a continuum of technology use and its resources that is ever changing and shifting from basic remediation and assessment software to the use of technology as a tool to foster collaboration and communication.



Technology is being used to differentiate instruction and enhance student achievement across the state:

- Technology is used to assess and benchmark student achievement and to redirect teaching and learning.
- The IMPACT Model for Media and Technology is being implemented to varying degrees across the state.
  - Currently there are 10 EETT-funded schools in a study with 5 middle schools scheduled to be added during the 2007-2008 school year.
  - 1163 schools currently have flexibly accessed media centers for circulation.
  - 863 schools currently have flexibly accessed media centers for instruction.
  - 696 schools currently have flexibly accessed technology lab centers.
  - 349 schools currently have Technology Facilitators on site.

- 4 schools districts had administrators participate in IMPACTing Leadership training each designing comprehensive IMPACT implementation plans grounded in change theory and ongoing formative evaluation procedures.
- Data is being collected and analyzed on 4 schools implementing 1:1 projects in NC funded via EETT.
- Students have access to media and technology resources throughout the school:
  - Average 4.2 computers per classroom (based on 24 students per classroom) (5.74 students per classroom computer)
  - 100% of schools have Internet access.
  - 98.8% of classrooms connected across the state
- 53 schools currently have 1:1 programs of some sort
- At the beginning of the 2005/2006 school year, 3000 students were enrolled in NCDPI-funded online classes including social studies, mathematics, and foreign languages, many at the Advanced Placement level. For the 2006-2007 school year, 4667 students are enrolled in NCDPI-funded online classes. In June 2007, the North Carolina Virtual Public School began officially offering courses.
- Examples of state-provided instructional resources and programs that support teaching and learning include :
  - NC WiseOwl
    - Thomson Gale Databases
    - Grolier Databases
    - Thomson Gale eBooks
  - Student distance learning opportunities online
    - NCVPS
  - Kaleidoscope
    - Techknow Park
    - Hovercraft
  - SASin School Curriculum Pathways
  - Web Resources
    - Virtual Visits
    - County Clips
  - 21st Century Schools initiative

- LEARN NC
- CFNC
- Computer Skills and Information Skills Curricula
- eBistro
- NC in the World
- NC DPI Geocaching Project

### *Strategic Goals*

1. Every student excels in rigorous and relevant core curriculum that reflects what students need to know and demonstrate in a global 21st Century environment, including a mastery of languages, an appreciation of the arts, and competencies in the use of technology.

In order to assure **that rigorous and relevant core curriculum that reflects what students need to know and demonstrate in a global 21st Century environment** will be provided for every student, the NCDPI will:

- Assist in the development of instructional strategies for technology integration, implementation, and infusion into the NC SCOS in support of 21st Century skills.
- Provide assistance for teachers, administrators, and support personnel to integrate technology into assessment and individualization of student instruction.
- Provide leadership in the support (via technology) of new graduation requirements like portfolios and the graduation project.
- Provide guidance in the integration of Computer Skills and Information Skills into all curriculum areas in support of 21st Century Learning via IMPACT Model implementation.
- Provide a planning model and support for this model that challenges LEAs to plan adequately for the delivery of instruction using 21<sup>st</sup> Century tools.

2. Every student's achievement is measured with an assessment system that informs instruction and evaluates knowledge, skills, performance, and dispositions needed in the 21st Century.

In order to assure that **every student's achievement is measured with an assessment system that informs instruction and evaluates knowledge, skills, performance, and dispositions needed in the 21st Century**, the NCDPI will

- Require that all NC students pass the eighth grade computer skills test prior to graduation.
- Provide ongoing support to LEAs in the implementation of the Online Test of Computer Skills.
- Provide resources to LEAs to support the development of students in using online learning assessment environments.

- Provide support to LEAs in the implementation of future online assessment experiences including Physics and future EOC testing opportunities.
- Provide online resources that allow LEAs and teachers to assess student learning styles and dispositions.
- Provide a planning model and support for this model that challenges LEAs to plan adequately for the assessment of knowledge, skills, performance, and dispositions needed in the 21<sup>st</sup> Century using 21<sup>st</sup> Century tools.

3. Every student will be enrolled in a course of study designed to prepare them to stay ahead of international competition.

In order to assure that **every student will be enrolled in a course of study designed to prepare them to stay ahead of international competition**, the NCDPI will

- Require that all NC students pass the eighth grade computer skills test prior to graduation.
- Provide guidance on instructional strategies for technology and information literacy integration into the NC Standard Course of Study.
- Provide guidance for teachers, administrators, and support personnel to use technology to assess and individualize student instruction.
- Provide guidance to LEAs to ensure equity in the distribution of and access to media and technology resources for all students.
- Provide guidance in the area of assistive technology selection.
- Provide guidance in the social, ethical, and legal use of information and technology.
- Provide guidance to LEAs in the use of emerging technology tools in curriculum applications especially as they relate to ongoing collaboration and communication in a global society such as Web 2.0 resources
- Provide guidance in the integration of Computer Skills and Information Skills into all curriculum areas in support of 21<sup>st</sup> Century Learning via IMPACT Model implementation.
- Provide a planning model and support for this model that challenges LEAs to plan adequately for the delivery of instruction utilizing 21<sup>st</sup> Century tools.
- Provide support in the use of technology for international understanding to include emphasis on global cultures, languages and economies.

4. Every student uses technology to access and demonstrate new knowledge and skills that will be needed as a life-long learner to be competitive in a constantly changing international environment.

In order to assure that **every student uses technology to access and demonstrate new knowledge and skills**, the NCDPI will:



- Require that all NC students pass the eighth grade computer skills test prior to graduation.
- Provide guidance on instructional strategies for integration of technology and information literacy into the NC Standard Course of Study.
- Provide guidance for teachers, administrators, and support personnel to use technology to assess and individualize student instruction.
- Provide guidance to LEAs to ensure equity in the distribution of and access to media and technology resources for all students.
- Provide guidance in the area of assistive technology selection.
- Provide guidance to LEAs in the use of emerging technology tools in curriculum applications especially as they relate to ongoing collaboration and communication in a global society such as Web 2.0 resources.
- Provide a planning model and support for this model that challenges LEAs to provide students with adequate access to 21<sup>st</sup> Century tools.
- Provide support in the use of technology for international understanding to include emphasis on global cultures, languages and economies.

5. Every student has the opportunity to graduate from high school with an Associates Degree or college transfer credit.

In order to assure that **every student graduates from high school with an Associates Degree or college transfer credit**, the NCDPI will

- Provide distance learning opportunities.
- Provide guidance to LEAs to ensure equity in the distribution of and access to media and technology resources for all students.
- Provide guidance in the area of assistive technology selection.
- Provide support to LEAs in the support and maintenance of technology resources in the Early College system as appropriate.
- Provide support for ongoing initiatives like Learn and Earn Online.

## **Goal 2: 21st Century Professionals**

### ***Essential Questions***

**What programs are in place to prepare teachers, administrators, and staff to use 21<sup>st</sup> Century Tools?**

**What 21<sup>st</sup> Century tools are available to help teachers, administrators, and staff become skilled in designing teaching strategies and learning environments that maximize the impact that technology has on learning?**

**How do teachers, administrators, and staff work with colleagues to guide their school system toward more effective uses of 21<sup>st</sup> Century tools in teaching, learning, and managing?**

**How are teachers, administrators, and staff prepared to understand, implement, and assess the span of skills and processes that students need to succeed in the 21<sup>st</sup> Century?**

**How are teachers, administrators, and staff prepared to apply 21<sup>st</sup> Century assessment systems to inform instruction and measure 21<sup>st</sup> Century knowledge, skills, performance, and dispositions? Are they prepared to apply new forms of assessment to the products of technology-supported learning?**

**How are teachers, administrators, and staff using 21<sup>st</sup> Century Skills to increase professional productivity and gain enriched access to professional resources?**

Compelling research indicates that the quality of teachers has an impact on student learning and achievement. In a longitudinal analysis of student achievement in the Tennessee school system, Wright, Horn, and Sanders (1997) found that the more effective teachers had the most significant impact on student achievement as determined by standardized tests. Furthermore, the states that continue to have the highest student test scores in mathematics and reading are states that have made the most substantial investment in creating and retaining the most highly qualified teacher workforce (Darling-Hammond, 1999).

Teachers are recognized as change agents who have the power to make a difference in classroom practices (Hurst, 1999). Research on classroom use of technology has determined that teacher skills are fundamental for effective use of instructional technology and that professional development is the catalyst to transform teaching practices that effectively use technology (Grove, Strudler, and Odell, 2004). As more technology becomes part of the K-12 environment, the need for knowledgeable teachers to use these tools effectively becomes paramount.

### ***Current Situation***

Technology professional development no longer means learning technology “skills” in isolation. A more integrated approach is being used in order for teachers to better understand the application of technology skills in the delivery of instruction. Education personnel currently receive professional development through a variety of resources including state and national conferences, on-line courses, IHE/graduate-level courses, one-on-one instruction, and system-level training opportunities. Evaluation of IMPACT Model Schools indicates that teachers in schools with technology facilitators who model technology use for teachers and provide follow up support to training more effectively use technology for instruction.

North Carolina Technology Support Personnel	Currently In Place	Recommended Minimum Needed To Support Current Technology	Percentage Of Support Currently In Place
INSTRUCTIONAL Technology Support	897.75	4712	19.05%
TECHNICAL Technology Support	574.5	1126	51.01
All Technology Support Personnel	1490.25	5838	25.53%

Recommended minimum number of Technology Support Personnel is based on the following:

Each LEA should have:

- One Technology Director or Chief Technology Officer.
- One Technology Coordinator for each 10 schools.
- One Technology Facilitator per school, per thousand students.
- One Technology Assistant per school, per thousand students.
- One Technician I, II, or III for every 400 computers. At least one of the Technicians should be a Technician III.
- One WAN Engineer per LEA (LEAs without a WAN should have one LAN Engineer).

NCDPI and 21<sup>st</sup> Century partners provide a variety of professional development opportunities including:

- On-site professional development through the services of teachers-on-loan
- Intel Teach Professional Development
- NC Classes Online
- E-Bistro
- USDLC satellite and online professional development
- Conference presentations
- NCWISE training
- LearnNC Online Professional Development Directory
- Thinkfinity
- North Carolina in the World

NCDPI provides guidance and standards for personnel and programs

- Performance appraisal instruments for media and technology personnel:
  - MCPAI
  - TFPAI
- Standards and criteria for media and technology certifications
- Classroom observation protocol i.e. LOFTI
- IMPACT: Guidelines for Media and Technology Programs
- IMPACT for Administrators
- IMPACT for Teachers
- Criteria for evaluation of online professional development
- Job descriptions for media and technology personnel (including salary guidelines for technical staff)
- Media and technology staffing guidelines
- ISTE NETS for teacher technology competencies

- ISTSE Nets for Administrators

### *Strategic Goals*

1. Education professionals have 21<sup>st</sup> Century preparation and access to ongoing high quality professional development aligned with State Board of Education priorities.

In order to assure that **professional preparation [is] aligned with state priorities**, the NCDPI will

- Maintain standards and criteria for media and technology certifications.
- Identify and promote opportunities for educators to upgrade professional skills and certifications.
- Identify and promote opportunities for educators to develop skills needed for the online learning community.
- Identify and promote resources for global awareness training
- Promote the ISTE NETS for teachers.
- Adopt the ISTE NETS for Administrators

2. A system to develop, train, and license a BK (birth-kindergarten) professional staff for public schools [will be developed].

In order to assure that **a system to develop, train, and license a BK (birth-kindergarten) professional staff for public schools**, the NCDPI will

- Promote the ISTE NETS for teachers
- Develop standards and criteria for media and technology certifications.

3. A system to recruit, retain, and compensate a diverse corps of quality teachers, administrators, and staff [will be maintained].

In order to assure that **a system to recruit, retain, and compensate a diverse corps of quality teachers, administrators, and staff [will be maintained]**, the NCDPI will

- Identify and promote opportunities for educators to upgrade professional skills and certifications.
- Provide guidance, standards, and guidelines to create a resource-rich, technology- rich teaching and learning environment that encourages teacher recruitment and retention.

4. A system to ensure high performance of teachers, administrators, and staff [will be maintained].

In order to assure that **a system to ensure high performance of teachers, administrators, and staff [will be maintained]**, the NCDPI will

- Promote the use of media and technology performance appraisal instruments.
- Provide training/strategies for evaluating classroom teachers in the use of technology resources within their classroom instruction.
- Promote the use of the SERVE School Technology Needs Assessment survey (STNA) for the assessment of school level staff development needs.
- Promote training/strategies to insure “assessment literacy” of educators (the readiness of educators to design, implement, and discuss assessment.)

5. A system of continuous learning and professional development to support high performance of all employees [will be implemented].

In order to assure that **a system of continuous learning and professional development to support high performance of all employees [will be implemented]**, the NCDPI will

- Create and maintain technology staff development opportunities for all educators.
- Identify and promote opportunities for educators to upgrade professional skills and certifications.
- Recommend and support the allocation of 25% of all technology funds to be used for professional development.
- Model high ethical and professional standards for all employees.

6. Ethical and professional standards that are aligned to state guidelines and policies [will be promoted].

In order to assure that **ethical and professional standards that are aligned to state guidelines and policies [will be promoted]**, the NCDPI will:

- Promote ethical use of technology resources.
- Identify and promote copyright workshop opportunities to NC educators.

### **Goal 3: Healthy, Responsible Students**

### *Essential Questions*

**What technology must we have in place to assure students, staff, parents, and volunteers that the school is a safe and caring environment?**

**How will the state ensure that both technology and human intervention programs are in place to provide students, staff, parents, and volunteers a healthy, safe, and caring environment?**

**How do teachers, administrators and staff guide students as they deal with the social, ethical, and legal issues related to life in a technological world?**

The North Carolina Standard Course of Study for Technology states the areas that must be integrated with curriculum and technology. Healthy, Responsible Students must be addressed in this area as well. This area crossing all areas of the education system, from transportation to child nutrition, from the administration to the classroom. Therefore, it must be addressed and approached as an area to be integrated closely with curriculum.

1. We must prepare students for a democratic society, one in which they must be able to function and be responsible in a global environment.
2. Our students must possess 21st Century skills.
3. Our students must have access to information, but we must also safeguard them from information that is deemed inappropriate for their grade and developmental levels.
  - a. Safeguarding and protecting student records and other personal information.
  - b. Protecting networks from intruders.
  - c. Physically protecting equipment.
  - d. Physically protecting students on school campus and transportation.
  - e. Providing additional training on the use of NCWISE Owl.
  - f. Encouraging the implementation and use of *IMPACT: Guidelines for North Carolina Media and Technology Programs*.

Research indicates that a combination of technology and human intervention is required to provide a healthy, safe, and caring environment. Planning is key and must be performed at all levels of the school system and supporting agencies to ensure that this goal is met.

The Northwest Regional Educational Laboratory points to several areas in which technology can aid in protecting the safety of children. In their *Guide 4: Ensuring Quality School Facilities and Security Technologies*, they address one- and two-way communication devices as being the least controversial and perhaps the most effective means of handling safety issues. Video surveillance equipment also is recognized as useful as long as maintenance and replacement costs are understood. Berkeley (California) High School is cited as an example of an actual school campus where video surveillance has decreased incidents of vandalism, fire alarms, theft, and fights. (Schneider, 2000). Fixed and mobile metal detectors are more costly safety measures.

As Coburn (2000) points out, however, before purchasing is done, administrators should analyze any data available and use this data to make wise decisions. Database programs that offer a way to sort and organize locations and types of infractions are especially useful in gathering and analyzing data. Such databases can also incorporate relevant medical and family information to aid in keeping students safe.

Additional safety precautions can be taken by using identification badges for both students and staff on a campus. While many campuses already require student ID cards, these cards could be used more widely. Magnetic ID cards may also be used for school lunch/snack purchases or to provide access areas of the schools via locked doors (Fickes, 1999).

### ***Current Situation***

Schools currently use a variety of technology and programs to provide a safe and orderly environment for students. Across the state, school systems use a combination of the following:

- At the building level
  - Fixed and mobile metal detectors
  - Video camera systems to monitor schools, playgrounds, parking lots, and sports areas
  - ID card systems
  - Internet Filtering based on CIPA
  - E-mail Filtering
  - Student information system programs
  - Student management programs
  - Handheld devices
  - Web sites for communication
  - Nutritional tracking systems
- At the classroom level
  - Telephones, intercoms, and radios



- iPods
- Cell phones
- GPS
- Web sites and e-mail to communicate with parents and students
- On the buses
  - Video cameras
  - Cell phones
  - GPS
  - Radios

NCDPI provides a variety of technology-based resources that provide a safe learning and working environment for the state's schools

- Learning Environment
  - Web sites of evaluated resources
  - EvaluTech
  - Kaleidoscope
  - Intel Teach to the Future
  - e-Bistro
  - CECAS
- Physical Environment
  - TMS
  - lobby guard
  - Name tags
  - 3d system
  - Nutritional tracking systems like Nutri-Kids and Point of Sales
- Working Environment
  - HRMS
  - BPC

- DDC
- UERS
- SIMS and NCWISE

### ***Strategic Goals***

1. Learning environments [will be] inviting and supportive of high student performance to insure students possess 21st Century skills.

In order to assure that **learning environments [will be] inviting and supportive of high student performance**, the NCDPI will

- Provide guidance in the use and implementation of NCWISE.
- Provide NC WiseOwl as a safe and accessible Web portal of Internet resources for students.
- Provide guidance in the implementation and use of *IMPACT: Guidelines for North Carolina Media and Technology Programs*.
- Provide guidance in the use of courses taught through the NCVPS network.
- Provide guidance in the creation and maintenance of user-friendly, informative Web sites.
- Provide guidance on the use and implementation of fixed and mobile metal detectors.
- Provide guidance to LEAs for supporting intervention programs through the use of technology.

2. Schools [will be] free of controlled and illegal substances and all harmful behavior.

In order to assure that **schools [will be] free of controlled and illegal substances and all harmful behavior**, the NCDPI will

- Provide guidance to LEAs for supporting intervention programs through the use of media and technology to encourage healthy life styles.
- Provide guidance on the use and implementation of fixed and mobile metal detectors.

3. Mutual respect of students, teachers, administrators, and parents [will be evident].

In order to assure that **mutual respect of students, teachers, administrators, and parents [will be evident]**, the NCDPI will

- Provide guidance in the use and implementation of NCWISE.

- Provide NC WiseOwl as a safe and accessible Web portal of Internet resources for students
- Provide guidance in the creation and maintenance of accessible, user-friendly, and informative Web sites.
- Provide guidance in the area of emerging technologies.
- Provide guidance on the implementation and use of an ID card system.
- Provide the minimum requirements for implementing video surveillance on buses and school campuses.
- Provide guidance on managing student physical education, exercise, and nutritional food intake via technology.
- Require that all LEAs adopt an adequate Acceptable Use Policy.
- Require that all LEAs adopt policies that address issues that affect the acquisition, support, and disposal of technology resources.

4. Adequate, safe education facilities that support high student performance [will be provided].

In order to assure that **adequate, safe education facilities that support high student performance [will be provided]**, the NCDPI will

- Provide the minimum requirements for implementing video surveillance on buses and school campuses.
- Provide guidance in how to best safe guard students from information that is deemed inappropriate for their grade and developmental levels.
- Provide the minimum requirements for protecting networks from intruders.
- Provide guidance in the knowledge and use of emerging technologies.
- Provide guidance on the implementation and use of an ID card system.
- Provide guidance on how best to protect hardware and networks from vandalism.
- Provide guidance on the use and implementation of classroom telephones and intercom systems.
- Require that all LEAs adopt a robust disaster recovery system.

## **Goal 4: Leadership for Innovation**

### ***Essential Questions***

**Are our expectations for 21<sup>st</sup> century education in North Carolina high enough?**

**Are North Carolina school leaders at the state-, district- and local- level prepared to lead and create a vision for 21<sup>st</sup> century education?**

**Are the mechanisms in place for school leaders to create 21<sup>st</sup> century learning cultures?**

**Are professional growth programs/opportunities available to prepare teachers and administrators to lead 21<sup>st</sup> century learning environments?**

Creating 21<sup>st</sup> century learning environments is not only about investing in technology but also investing in people and creating a culture appropriate for 21<sup>st</sup> century learning. As Michael Fullan (2001) points out, leading in a culture of change does not mean placing new individuals into unchanged environments. Rather, change leaders work on changing the context, helping create new settings conducive to learning, and creating that setting with those already invested in the community. As Fullan states, "change is a process, not an event."

"Schools will be most effective in educating students if the design [of public schools] — or redesigns — are based explicitly on specific student outcomes and attributes that are valued in the world today." (Partnership for 21<sup>st</sup> Century Skills, 2006) While every school and school district superintendent, principal, and media and technology director has laid the foundation for 21<sup>st</sup> century learning by establishing and maintaining technology programs in local school districts, the North Carolina Public School system still has more to accomplish. Planning and implementing a successful statewide education program grounded in the elements of 21<sup>st</sup> century skills education requires leadership and collaboration among many constituencies from the state, district, and school levels to engage all people in creating a learning environment that aligns with a 21<sup>st</sup> century high-tech work environment and global economy.

### ***Current Situation***

The North Carolina State Board of Education Mission and Goals for 21<sup>st</sup> Century Learning (2006) has established the standard and shared a vision for 21<sup>st</sup> century learning in North Carolina schools. As part of that vision the State Board mission calls for leadership that will guide innovation in NC public schools, where

- School professionals will collaborate with national and international partners to discover innovative transformational strategies that will facilitate change, remove barriers for 21<sup>st</sup> Century learning, and understand global connections.
- School leaders will create a culture that embraces change and promotes dynamic continuous improvement.
- Educational professionals will make decisions in collaboration with parents, students, businesses, education institutions, and faith-based and other community and civic organizations to impact student success.

- The public school professionals will collaborate with community colleges and public and private universities and colleges to provide enhanced educational opportunities for students.

Information and Communications Technologies (ICT) are a driving force in the workplace, communities, and personal lives in the 21<sup>st</sup> century. To establish 21<sup>st</sup> century learning environments where students use ICT to learn core subject matter, solve problems, and think critically; to manage, create and communicate information; and, to enhance productivity and personal development, state-level leaders must:

- Create a vision for 21<sup>st</sup> century education
- Create 21<sup>st</sup> century school leaders able to communicate the 21<sup>st</sup> century vision for education
- Create mechanisms for creating a shared culture for realizing the vision for 21<sup>st</sup> century education in North Carolina schools
- Create 21<sup>st</sup> century education facilities that support the vision, and
- Create resources that maximize the use of ICT and 21<sup>st</sup> century education facilities to integrate 21<sup>st</sup> century skills into curriculum and instruction.
- Create opportunities for professional growth for teachers and administrators that incorporate the development of ICT skills.

The programs and tools that are in place that can be used to make North Carolina's vision for 21<sup>st</sup> Century learning a reality are:

1. To create a vision for 21<sup>st</sup> Century education:

- The North Carolina State Board of Education Mission and Goals for 21<sup>st</sup> Century Learning
- *The Impact: Guidelines for North Carolina Media and Technology Programs*
- North Carolina Department of Public Instruction Reading Philosophy Statement
- *The Business and Education Technology Alliance Report and Recommendations for Preparing North Carolina for Competitive Advantage in the Knowledge Age*, 2006. (<http://www.ncwiseowl.org/Impact/stc/docs/BETA2006%20Report.pdf>)
- *Worldwide Schoolhouse: A Global Vision for Learning in North Carolina*, eLearning Commission, 2006. (<http://www.ncwiseowl.org/Impact/stc/docs/ELCPhaseII1-30-06.pdf>)

2. To create 21<sup>st</sup> century school leaders able to communicate the 21<sup>st</sup> century vision for education:

- UNC Center for School Leadership Development
- Friday Institute for Educational Innovation
- North Carolina college and university schools of education

3. To create mechanisms for creating a shared culture for realizing the vision for 21<sup>st</sup> century education in North Carolina schools

- The North Carolina Center for the Advancement of Teaching (NCCAT)
- The North Carolina Teacher Academy (NCTA)

4. To create 21<sup>st</sup> century education facilities that support the vision

- New Schools Project
- *Technical Standards Document*
- *Developing Regional Education Networks*, e-NC Authority, 2006.  
(<http://www.ncwiseowl.org/Impact/stc/docs/Developing%20Regional%20Education%20Networks.pdf>)
- North Carolina Virtual Public School
- North Carolina Learn and Earn program

5. To create resources that maximize the use of ICT and 21<sup>st</sup> century education facilities to integrate 21<sup>st</sup> century skills into curriculum and instruction.

- North Carolina Standard Course of Study
- North Carolina Virtual Public School
- NC WISE
- NC WiseOwl
- Kaleidoscope
- LearnNC

### **Strategic Priorities**

1. Schools collaborate with national and international partners to discover innovative transformational strategies that will facilitate change, remove barriers for 21st Century learning, and understand global connections.

In order to assure that **schools collaborate with national and international partners to discover innovative transformational strategies that will facilitate change, remove barriers for 21st Century learning, and understand global connections**, the NCDPI will

- Develop 21<sup>st</sup> Century guidelines that promote resources developed by state and national partners.
- Participate in national professional development opportunities such as those offered through the State Educational Technology Directors Association, SETDA.
- Share best practices in the North Carolina Instructional Technology program with other states through presentations and sessions at national conferences and to national organizations.

2. Schools create a culture that embraces change as dynamic continuous improvement.

In order to assure that **schools create a culture that embraces change as dynamic continuous improvement**, the NCDPI will

- Continue to promote the NETS for Teachers.
- Adopt and promote the NETS for Administrators.
- Create avenues for developing the ICT skills of North Carolina Educators to facilitate teaching, learning, and working in a 21<sup>st</sup> century education environment.
- Understand and establish policies and procedures that support 21<sup>st</sup> century work environments, as well as learning environments.
- Develop appropriate accountability tools and assessment measures for 21<sup>st</sup> century learning environments.
- Develop performance management processes and tools from hiring to retirement that reward and maximize productivity and continuous improvement appropriate for 21<sup>st</sup> work environments.
- Establish processes and management techniques (i.e., scheduling, meeting facilitation, shared decision-making techniques) that allow educators to collaborate and work as a team in a high technology environment.
- Learn the tools for planning and implementing change in a manner that minimizes resistance and increases participation of the education workforce as we move to a 21<sup>st</sup> century learning environment.
- Determine and develop techniques and practice for developing the many interpersonal skills of the education workforce necessary to nurture and grow productive and balanced workplace relationships in virtual, high-technology environments.

3. Education decisions are made in collaboration with parents, students, businesses, education institutions, and faith-based and other community and civic organizations to impact student success.

In order to assure that **education decisions are made in collaboration with parents, students, businesses, education institutions, and faith-based and other community and civic organizations to impact student success**, the NCDPI will

- Publicize best practices in community programs within schools in NC. i.e. Community Technology Learning Centers.
- Continue work with the Business and Education Technology Alliance, the eLearning Committee, the School Technology Commission, and other business and community groups across the state.

4. The public school professionals will collaborate with community colleges and public and private universities and colleges to provide enhanced educational opportunities for students.

In order to assure that **the public school professionals will collaborate with community colleges and public and private universities and colleges to provide enhanced educational opportunities for students**, the NCDPI will

- Work with higher education institutions to maintain standards and criteria for media and technology certifications.
- Identify and promote opportunities for educators to upgrade professional skills and certifications.
- Identify and promote opportunities for educators to develop skills needed for the online learning community.
- Promote the ISTE NETS for teachers and administrators with higher education institutions



## **Goal 5: 21<sup>st</sup> Century Systems**

### ***Essential Questions***

**Under what conditions does technology have the most benefits for students?**

**What technology is in place to effectively meet the goals of globally competitive student performance?**

**What funding sources/processes are in place to sustain a 21<sup>st</sup> Century technology infrastructure and instructional technology program?**

According to Scheerens and Creemers (1989) the school is not a closed unit; it is a system that interacts constantly with the environment. The effectiveness of the school organization is dependent on the situation or the context of that environment. School effectiveness is a complex, multifaceted process requiring continuous planning, implementation, and monitoring. Planning goals should concentrate on bringing about the correlates of effective schools outlined in the well-recognized research of Lezotte and Levine (1990): clear school mission, high expectations for success, strong consistent instructional leadership, a safe and orderly environment, frequent monitoring of student progress, and solid community-school relations.

During the last decade, state and federal law makers have mandated consistent monitoring of student and school progress to meet federal and state student, teacher, and school accountability requirements (*Education Week*, 2004). Specifically, the Federal No Child Left Behind (NCLB) legislation enacted in 2001 and the State Basic Education Statute (115c-81) require state education agencies and school districts to determine adequate yearly progress of student performance, annual performance of schools and school districts, and quality of teacher workforce. Compilation of timely and useful data provide educators with the ability to

- ***Assess*** the needs of students
- ***Determine*** if school goals are being met
- ***Engage*** in continuous school improvement
- ***Identify*** causes of problems and the appropriate interventions

(Mid-continent Research for Education and Learning, 2003)

However, collecting and analyzing comprehensive school and student data pose major challenges for already overworked educators with limited resources. The state of North Carolina and Local Education Agencies clearly need a 21<sup>st</sup> Century technology infrastructure to meet NCLB's data management and analysis expectations and to support the guiding mission of the North Carolina State Board of Education for Future Ready Students. School administrators and educators should have real-time access to student and school electronic data to support decisions.

Past experience has shown that the most effective implementation of learning and instructional management technologies occurs when the funding is continuous (Education Commission of the States, 2001). Continuous funding facilitates the development of high quality, long-range local plans and allows for the deployment of resources to be coordinated with professional learning and infrastructure improvements. The total cost of ownership (TCO) of the technology infrastructure will vary based on network, district size, geography, the age of existing infrastructure, staffing, and school management.

### *Current Situation*

Federal E-Rate funds and grants, State Technology Trust Fund Money, and local funding sources have been used to support technology in North Carolina's K-12 Public Schools. (see Table 1 below). Processes should be in place for financial planning and budgeting focused on resource attainment and alignment with priorities. Recognizing a total cost of ownership framework as the best model for implementing a fully operational instructional technology program, supporting a technology program means funding should include:

- The installation, maintenance, and support of a LAN network infrastructure,
- The installation, maintenance, and support of a district WAN (Wide Area Network) network infrastructure,
- Ample, consistent state-wide network access, Internet access, and Internet II access,
- Ongoing professional learning for teachers,
- Adequate curriculum and instructional materials,
- Electronic instructional resources including virtual courses for both students and teachers,
- Appropriate technical and instructional personnel,
- Ample access to hardware, and
- Appropriate Disaster Recovery/Business Continuity planning and implementation.

The Total Cost of Ownership for technology programs in North Carolina's K-12 Public Schools has increased from \$150 per pupil in 2003-04, to \$218 per pupil in 2005-06 (This data comes from LEA entries on the North Carolina TCO Instrument).

Table 1. Funding for Technology				
	Federal		State	
Year	E-Rate	EETT/TLCF	Trust Fund	Fines and Forfeitures*
2005/2006	\$52,306,515.34	\$10,778,695.00	\$10,000,000.00	\$21,363,505.00
2004/2005	\$43,171,034.93	\$14,392,700.00	\$10,000,000.00	\$15,319,767.00
2003/2004	\$50,235,920.51	\$14,721,370.00	\$10,000,000.00	\$14,183,042.00
2002/2003	\$54,288,531.92	\$12,685,051.00	\$10,000,000.00	\$9,563,151.00
Total	\$200,002,002.70	\$52,577,816.00	\$40,000,000.00	\$60,429,465.00
TOTAL	\$252,579,818.70		\$100,429,465.00	
Funding expended between 2002-2006:				

\*This information was provided by Financial and Business Services.

This table represents the expenditures for technology programs in North Carolina for the last four years from Federal E-Rate funds and grants, State Technology Trust Fund Money, and other Local funding sources. It does not include funds used for technology from all Federal and State codes. Those other Federal and State codes account for an average of over \$50 million per year.

According to the 2005-2006 Annual Media and Technology Report (AMTR), in North Carolina schools, there is an average of 3.24 students to every computer. Further, there is an average of 3.59 students to every modern computer (Pentium III and above and Macintosh G3 and above), 3.43 students to every computer connected to the Internet. Furthermore,

- 97.25% of North Carolina schools have a school Web page;
- 99.13% of North Carolina school districts have a Wide Area Network;
- 99.55% of the school systems provide e-mail accounts for certified staff;
- 97.88% of the school systems provide e-mail accounts for non-certified staff; and,
- 98.29% of the schools in North Carolina have a Local Area Network.

While school-level, district-level, and state-level officials and administrators recognize that students and teachers need access to technology resources, the need for technical and instructional personnel to support school technology programs remains overlooked. According to the 2005/06 AMTR, 73.9% of North Carolina School districts employ less than 50% of the technical support personnel needed to adequately support and maintain the technology infrastructure for the school district. Likewise, 15.71% of schools employ a certified instructional technology facilitator, 76.52% of school districts employ a full-time technology director, and 13.91% employ a full-time media director.

North Carolina has been a forerunner in providing standardized, statewide electronic applications for public schools. The North Carolina Department of Public Instruction (NCDPI) provides access to a variety of electronic learning tools for instruction and electronic applications for administrative purposes. Table 2. *Educational Applications* outlines the applications supported and maintained by the NCDPI and the benefits of those applications for North Carolina Schools.

Table 2. Educational Applications

Application	
<i>Administrative Applications</i>	
<i>AMTR (Annual Media and Technology Report)</i> (AMTR): a legislatively mandated instrument that provides data on school media and technology programs to school, district, and state level stakeholders. The	Questions included in this report are based on the N C Educational Technology Plan requirements and requests for data from agencies within the

<p>information is based on the school and district level media and technology inventories on July 1 of each year. This report gives both the legislature and the public a yearly snapshot of the state of media and technology programs in North Carolina's schools.</p>	<p>NCDPI and state government. Once collected and analyzed, this data is used by the federal and state governments, the State Board of Education, Other divisions of the N.C. Department of Public Instruction (NCDPI), LEAs, and the public. Frequently budgetary and resource allocation decisions are impacted by this data. The data may be used to determine eligibility for grant funding, to support the needs addressed in grant proposals, and to evaluate and improve school media and technology programs. Data and reports generated from this data are disseminated at state and national conferences, in publications at the national, state and local levels, on NCDPI websites, and as part of the ABC Report Card process.</p>
<p><i>HRMS (LEA Human Resource Management System)</i> (HRMS): a Web-based application that provides the ability to submit applications to NC school districts via the Web and provides school systems a tool to manage their applicant screening and hiring process, employment, benefits, and evaluation. It also allows for a tight integration with the payroll system, eliminating the need for redundant data entry and maintenance. It provides online licensure information from DPI and provides an effective reporting tool.</p> <p><a href="http://schooljobs.dpi.state.nc.us/">http://schooljobs.dpi.state.nc.us/</a></p>	<p>The ability to hire the most qualified candidates, both certified and classified, in our schools is the primary objective of the human resources and finance offices. The HRMS allows school systems to operate more efficiently and effectively by providing direct and immediate access to candidate applications and employee information through the Internet which makes the selection and hiring processes more expedient. It also allows the personnel and finance offices in each school system to share information electronically, thereby eliminating the need for out-</p>

	dated paper processing, as well as improving response time for employee questions and concerns.
<p><i>North Carolina Schools Report Card :</i> State and federal authorities require schools to issue annual progress reports to parents with information about their child's school. North Carolina has combined federal and state requirements to issue one report card for each school, each school district and the state. The report cards provide parents and others who are interested in the public schools in North Carolina with information about school-, district- and state-level data in a number of areas. These areas include student performance on tests, teacher qualifications, school safety, class and school sizes, and school resources. Statewide information is in one easy-to-use Web site, <a href="http://www.ncreportcards.org">http://www.ncreportcards.org</a></p>	<p>The school report card has forced schools to look at themselves as parents and community members might see them and to formulate ways to improve. In order to meet highly qualified staff standards, teachers and teacher assistants are seeking additional training; to meet safety standards guidelines are being practiced. Stronger efforts are being made to provide adequate resources and reduce class size. Communities that examine and compare report cards are recognizing their responsibility to allocate energy and effort as well as funding to improve their schools. North Carolina schools have moved away from "doing the best we can do" to "striving toward the best that can be done."</p>
<p><i>The ABCs Report of Public Education:</i> The ABCs Report provides a standardized set of information about every North Carolina school to parents, educators, and the public concerning ABC status and an Annual Yearly Progress (AYP) determination. <a href="http://abcs.ncpublicschools.org/abcs/">http://abcs.ncpublicschools.org/abcs/</a></p>	<p>North Carolina stresses student growth—a year's growth for a year of instruction. In classrooms this means teachers must address the growth of all students—the gifted child who began the year two years above grade level as well as the child who struggled to work at grade level. The annual yearly progress standard of No Child Left Behind has eradicated excusing low growth for children from low-income families or representatives of ethnic minorities or those who struggle with physical or</p>

	<p>mental impairments. Instead teachers are seeking a better understanding of the obstacles these conditions present and the development of strategies to improve learning for every student. The combination of ABCs growth requirements and No Child Left Behind progress standards works to establish an environment that begins with every child where he is and encourages him to progress as far as he can go.</p>
<p><i>NCWISE</i>: North Carolina Window of Information on Student Education, NCWISE, is a secure Web-based, multi-mode application for effectively managing student information to support instructional activities in North Carolina schools. NCWISE provides teachers, principals, counselors, nurses, central office staff, and others with direct and immediate access to information about every student's K-12 education in the North Carolina school system. NCWISE supports federal and state reporting requirements associated with No Child Left Behind, ABCs Accountability, School Report Card, and Closing The Gap. NCWISE is expected to be deployed statewide by 2007.</p>	<p>NCWISE is a complete student information management system that provides educators with the tools they need to make informed decisions. Data is entered by teachers, counselors, data managers, and other personnel. This same data can be accessed by school personnel to print reports, call parents, and make decisions about children and programs. The program is centralized making data analysis at the LEA level and at the state level easy and in real time.</p>
<p><i>TIMS</i>: The Transportation Information Management System (TIMS) is a bus routing and school planning software used by all NC districts as required by North Carolina G. S. 115C-240(d). Based on Geographic Information Systems (GIS), it allows district personnel to determine efficient routes, manage student data, transfer student data between school districts, enhance safety, provide readily available information to the school and central office, and realign district boundaries. An option is the ability to integrate TIMS data with Global Positioning Units (GPS).</p>	<p>TIMS allows LEAs to run their transportation systems efficiently and to plan for changes in district boundaries and bus routes. With TIMS, district personnel can transfer student data between school districts. Future connectivity with NCWISE will allow schools to determine exactly where a student lives based on their address and assign transportation based on the information.</p>

<p><i>Instructional Applications</i></p>	
<p><i>North Carolina Virtual Public School:</i> The North Carolina Virtual Public School (NCVPS) provides courses and academic programs in an online environment to students throughout the state and/or in other geographic areas. The NCVPS has a current mission to provide courses and services to high school students with a continuing vision to provide online learning options for all K-12 students.</p> <p><a href="http://www.ncvps.org/">http://www.ncvps.org/</a></p>	<p>The NCVPS provides new learning opportunities for students, parents, and teachers in all parts of the state. Registered students throughout the state are able to participate in required, elective, and advanced placement courses on an anytime, anywhere basis using their personal computers or school based computers and the Internet. Through learning tools such as telephones, email, instant messaging, and online chat forums students may interact with classmates and teachers across the state to complete assignments, receive grades, and receive teacher input and feedback. Through the NCVPS students can design a course schedule that makes their education more active, more personal, more convenient, and more suited to their individual learning style(s) while accomplishing the goals of the NC SCOS in a 21<sup>st</sup> Century environment.</p>
<p><i>Kaleidoscope :</i> Kaleidoscope is a comprehensive site for busy elementary educators striving to integrate the North Carolina Computer Skills and Information Skills curricula into the Standard Course of Study. This Web portal takes North Carolina teachers and students through a typical school year, linking students to rich online learning resources, while modeling “best practice” for the integration of Internet content in the classroom. <a href="http://www.ncwiseowl.org/kscope">http://www.ncwiseowl.org/kscope</a></p>	<p>Kaleidoscope is a comprehensive toolkit of instructional resources that exemplifies “best practices” with regard to teaching and learning and empowers teachers to deliver a truly balanced curriculum. Through its use, computer and information skills are seamlessly taught, and instruction in various curriculum areas is simultaneously delivered and enhanced.</p>

<p><i>NC WiseOwl</i> : NC WiseOwl provides free online resources for the public and charter schools in North Carolina. The NC WiseOwl program ensures that all of our students will have access to quality research tools and curriculum support materials regardless of the economic status of their local school districts. All of the reference sources on WiseOwl are available for student and parent use at home as well as at school. <a href="http://www.ncwiseowl.org">http://www.ncwiseowl.org</a></p>	<p>NCWiseOwl is a great place to let your students do research as it contains newspaper and magazine articles, encyclopedias, dictionaries, and more - all free from the state. Through this resource students have the benefit of learning information skills while researching content specific topics in a secure environment.</p>
<p><i>SAS inSchool Curriculum Pathways</i> : Designed for teachers and students in grades 8-14, this Web-based planning resource offers a wealth of material in all the core disciplines. Lesson plans, projects, and classroom activities are available for Introductory Algebra, Earth Science, English Language, Spanish Grammar, and Contemporary World History. In addition, materials have been added in science, the planning page for teachers has been modified to emphasize interaction and assessment, and Web resources have been updated.</p>	<p>Interactivities and Web Inquiries are two components of Curriculum Pathways that use the power of the Internet to make top-shelf resources ubiquitously available. Students proceed independently or in small groups through carefully designed, up-to-date learning sequences. They are challenged at every turn.</p> <p>The students learn to analyze data to solve problems. They compare and contrast to form conclusions. They research. Teachers circulate and add value as needed.</p>
<p><i>Career Technical Education Planning and Performance Management System</i> : CTE Planning and Performance Management helps each LEA to plan and manage both long-term and short-term performance for workforce development education. This system provides critical information about CTE in each school system and applicable schools in it. This information includes numbers and kinds of students, courses, and services; federal and state fiscal and program requirements; annual performance benchmarks and accountability scores; and local strategies to take advantage of the greatest opportunities for improving CTE</p>	<p>Federal legislation (Perkins Act of 1998) requires that schools and school systems show continuous improvement in student achievement in six areas. Two major areas are academic attainment of CTE concentrators and the technical attainment of CTE enrollees. The Planning and Performance Management System (PPMS) provides a unified data collection and analysis process for</p>



<p>during the year in question. It is connected to a variety of information needed to better plan and manage performance in CTE.</p> <p><a href="http://wdeppms.dpi.state.nc.us">http://wdeppms.dpi.state.nc.us</a></p>	<p>administrators and teachers to design CTE programs that effectively aid in the academic and technical attainment of CTE students. The PPMS allows program planners to evaluate trends and develop strategies to reverse negative trends and reinforce positive trends. The PPMS allows LEA administrators to align funding with strategies and strategies with school level CTE program goals and needs.</p>
<p><i>Professional Learning Applications</i></p> <p><i>eBistro:</i> eBistro is a professional learning tool for educators in North Carolina that helps teachers acquire professional skills which allow them to be knowledgeable and comfortable integrating technology into the curriculum. Participants are able to create a login, complete individual learning modules, and save their work in their own digital portfolio. Other areas of eBistro provide resources for grant writing and other items deemed important for teachers.</p> <p><a href="http://www.landmark-project.com/ebistro/">http://www.landmark-project.com/ebistro/</a></p>	<p>eBistro can be used independently by educators to direct and promote their own learning. CEU credits for 21<sup>st</sup> Century professional learning through eBistro may be awarded through individual LEAs. Educators wishing to take advantage of this free professional learning service may begin at will by browsing the Modules to develop a course of study to meet their needs and then creating a login and individual portfolio. Each learning module contains the following main sections:</p> <ul style="list-style-type: none"> <li>• Preparation – activities to prepare participants for their learning experience.</li> <li>• Engagement – a plethora of activities that take participants through the key ideas and concepts that they will learn.</li> <li>• Reflection – activities</li> </ul>

	<p>that ask participants to reflect on the material they have encountered.</p> <ul style="list-style-type: none"> <li>• Exploration – activities that require participants to begin thinking about applying their learning in their own classrooms and daily work.</li> </ul> <p>Implementation – activities that complete the participant’s learning experience through full implementation in their classroom.</p>
<p><i>Literacy to Learn:</i> The United Star Distance Learning Consortium (USDLC) is a nonprofit educational consortium that is grant funded and is committed to excellence in professional learning. One of the USDLC's missions is to provide all educators with appropriate access to high quality, 21<sup>st</sup> Century professional learning opportunities.</p> <p><a href="http://www.usdlc.org/">http://www.usdlc.org/</a></p>	<p>NC DPI purchases and provides a state license that enables educators in all school systems to access resources for professional learning free of charge. A wide variety of online modules and video-on-demand programs are available. To access professional learning services through the USDLC an LEA’s professional development coordinator may submit a registration form or complete an online registration form. After an LEA is registered a unique ID and Password are issued. The ID and password may be used by educators to login to the USDLC site to view videos and/or online courses.</p>
<p><i>Learn NC:</i> LEARN North Carolina is a program of the School of Education at the University of North Carolina at Chapel Hill. Learn NC seeks to improve education through use of the Internet by providing a variety of quality resources for professional</p>	<p>Learn NC provides online professional learning opportunities for K-12 educators that allow them to seek a personal course of study and CEU credit based</p>

learning for K–12 educators.

<http://www.learnnc.org>

on a schedule that is convenient for the individual educator. All courses are available across the state and are led by a qualified instructor. The content of the courses is aligned to the National Educator Technology Standards. LearnNC requires tuition for professional learning courses; therefore, a number of courses are funded by the North Carolina Department of Public Instruction yearly providing free tuition for in-service North Carolina teachers.

### *Strategic Goals*

Based on these correlates, the North Carolina strategic plan for excellent schools identifies four broad strategic priorities for maintaining the goal of 21<sup>st</sup> Century Systems within its school system:

1. Processes are in place for financial planning and budgeting that focus on resource attainment and alignment with priorities to maximize student achievement.

In order to assure that **processes are in place for financial planning and budgeting that focus on resource attainment and alignment with priorities to maximize student achievement**, the NCDPI will

- Maintain online instructional resources, including online courses via NCVPS, for all North Carolina Schools.
- Establish and maintain standards, policies, and guidelines for media and technology programs.
- Provide guidelines for age-appropriate technology skills (NC Standard Course of Study Information and Computer Skills Curriculum).
- Establish and maintain standards, policies, and guidelines for infrastructure.
- Formally monitor the implementation of LEA Technology Plans on a yearly basis as mandated by legislation.

- Provide consultation and support services for maximizing E-Rate funding potential at the LEA level.
  - Provide models for total cost of ownership budgeting for technology.
2. 21st Century technology and learning tools are available and are supported by school facilities that have the capacity for 21st Century learning.

In order to assure that **21st Century technology and learning tools are available and are supported**, the NCDPI will

- Maintain online instructional resources, including online courses via NCVPS, for all North Carolina Schools.
  - Establish and maintain standards, policies, and guidelines for media and technology programs.
  - Establish and maintain standards, policies, and guidelines for infrastructure.
  - Formally monitor the implementation of LEA Technology Plans on a yearly basis as mandated by legislation.
  - Annually collect and report data on school media and technology programs to school, district, and state level stakeholders.
  - Provide models for total cost of ownership budgeting for technology
3. Information and fiscal accountability systems are capable of collecting relevant data and reporting strategic and operational results.

In order to assure that **information and fiscal accountability systems are capable of collecting relevant data and reporting strategic and operational results**, the NCDPI will

- Develop and implement a statewide online student information management system (NC WISE).
  - Annually collect and report data on school media and technology programs to school, district, and state level stakeholders.
  - Provide recommendations for maintaining security on school local area networks (LANs) and wide area networks (WANs).
  - Provide policy leadership to assist LEAs in developing proactive security policies that meet the needs of local, state, and federal regulations such as FERPA and HIPPA.
4. Procedures are in place to support and sanction schools that are not meeting state standards for student achievement.

In order to assure that **procedures are in place to support and sanction schools that are not meeting state standards for student achievement**, the NCDPI will

- Maintain online instructional resources, including online courses via NCVPS, for all North Carolina Schools.

- Formally monitor the implementation of LEA Technology Plans on a yearly basis as mandated by legislation.
- Annually collect and report data on school media and technology programs to school, district, and state level stakeholders.
- Provide models for total cost of ownership budgeting for technology.

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